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Ministry of Transportation and Communications

Policy Planning and Research Division

Travel Demand Forecasting Input to the Priority Planning System

Policy Planning Branch

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Travel Demand Forecasting Input to the Priority Planning System

A Guide for Ministry Transportation Planners Involved in the P.P.S., Including a Progress Report on the 1981 Program.

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TRAVEL DEMAND FORECASTING INPUTS TO THE PRIORITY PLANNING SYSTEM

1. Introduction - The Priority Planning System

The Ministry's Priority Planning System (P.P.S.) is a group of computerized programs capable of systematically assessing transportation improvements. The development of P.P.S. was undertaken in 1972 to serve as a bridge between the planning function of the Ministry and the program delivery function.

Currently, the Ministry produces a 'Future Perspective' document which reflects a planning viewpoint of the future. Contained in the Perspective is a description of major capacity improvements proposed for the twenty year Provincial Highway Network based on either a level of service criteria or other government objectives. The purpose of the Perspective is to serve as the current long-range planning reference independent of project timing.

All of the improvements in the Perspective are analysed yearly through the Priority Planning System. The P.P.S. attempts to organize the planning improvements into one central control system which orders the projects into a manageable sequence. This order is based on the optimization of client benefits and the limitation of fiscal constraints. The results and products from the P.P.S. are then made available to senior management to assist them in the decision-making process.

Basically, there are three computerized subsystems in the P.P.S. First, there is the creation of a data file containing costs and physical description of (i) existing highways on which improvements are proposed, and (ii) proposed new facilities. Secondly, the present value of costs and benefits streams over the defined planning horizon is calculated. Cost-benefit ratio streams may also be calculated at this time. And third, from the master improvement file and the optimization routine, using linear programming techniques, the priority of projects is assessed under yearly budget restrictions.

The inputs to the system are cost parameters, the geometrics of each present link and improvement descriptions plus traffic volumes for calculating user costs of a specific link and it's volume. Three

representative vehicles are considered throughout the system: passenger car, single unit truck and transport truck.

The cost variables included in the input are:

(1) The costs of the required right-of-way in dollars/acre in the base year, and at some future year. The required acreage may be broken down into various land use types with differeng costs. And, as the land use will change over time, the acreage of each type of land may vary, but the total acreage will remain constant.

(2) The cost of actual construction in dollars per mile.

(3) In the case of a new facility, a cost of reconstruction is required in order to compute a salvage value.

(4) The cost of structures is required in dollars per square foot.

(5) There are also two maintenance cost factors, one to cover the extra maintenance incurred by the addition to the system, and a surface maintenance saving because of the improved system.

Benefits, which represent the change in user and non-user costs due to the improvement, are calculated for each improvement alternative over it's predicted facility lifetime.

Three types of benefits are calculated independently:

(1) Vehicle operating cost savings or dis-savings, including fuel, oil, tire wear, repair and maintenance, and depreciation. An overall factor for congestion is applied, where applicable, to the total operating cost, excluding depreciation. Fuel represents the largest component of running costs, and is the most sensitive to changes in operating conditions.

(2) Travel time savings are calculated for drivers and passengers in motor cars, drivers of single unit trucks and drivers of transport trucks. Calculations are performed for each link for each of ten volume-speed intervals for each of three vehicle types. For each vehicle type, the total time costs depend on the number of vehicles of that type, time value per person in the vehicle and occupancy rate of the vehicle.

(3) Accident savings are calculated for three types of accidents; fatal, personal injury and property damage. For each accident type, data is required on the cost per accident and the proportion by highway type. The accident rate for existing roads is known; for the improved road, a representative accident rate (usually a provincial average) is used for each of three types of highway - two lane, multi-lane and freeway.

1. The majority of this text was excerpted from the report "Priority Planning System Resume", Highway Program Development Branch, December 1978.

2. Travel Demand Forecasting Inputs

As noted in the Introduction, traffic volumes for the base year (primarily based on road inventory data) and estimated volumes for the horizon year are required by the system in order to calculate the user and non-user costs on the road network assuming no improvement. The benefits also require the calculation of these costs on the improved network, which necessitates the estimation of travel demand (base and horizon year) for that network. These forecasts are provided on a yearly basis in support of the Ministry's annual Strategic Planning Cycle, and in accordance with the Provincial Highways Position and Prospects Reports.

The forecasts are used in conjunction with the characteristics of the road network (link speed, distance, physical characteristics) to calculate user and non-user costs (operating, travel time, accidents) for all vehicles on each network link, then summed to the total road network. The forecasts are input into the system using Input Form #3 for Program TR03706 (see Exhibit #1). These inputs are commonly referred to as "E-cards" and require base and horizon year AADT, base and horizon year estimates for single unit and transport trucks (as a percentage of AADT), Permanent Counting Station number, and auto occupancy rate for each link in the network for both the "before" and "after" network cases. Miscellaneous coding for identification purposes is also required.

Exhibit 1/ System 037 — Road User Benefits

INPUT FORM 3-USER BENEFITS (CODES 300-399) ROUTE DESCRIPTIONS

REF. TO "INSTRUCTION MANUAL - SYSTEM 037 USER BENEFITS"

	SYSTEM ELEMENT No.	IMPROVEMENT No.	IMPR. ALT. No.	SYSTEM TYPE
1	2 3 4 5	6	7	8 9 10 11 12 13
E				

M — ENTER ONLY IN FIRST LINE OF EACH GROUP (EXISTING WITH OR WITHOUT IMPROVEMENT AND IMPROVEMENT GROUP)

ENTER 2 FOR WITHOUT IMPROVEMENT
1 FOR WITH IMPROVEMENT
1 FOR IMPROVED GROUP

ACCIDENTS PER MILLION VEHICLE MILES	URBAN ONLY: No. OF HOURS PARKING ALLOWED		EXIST. ROUTE ALT. No.		A NODE	B NODE	A. A. D. T. FOR YEAR INDICATED					% SINGLE UNIT TRUCKS		% TRANSPORT TRUCK		P. C. S. No. (RURAL)	OCCUPANCY RATE	URBAN LINK: ONE WAY PEAK HOUR VOLUME (VEH./HOUR)		URBAN LINK	SYSTEM ELEM. AND IMPR. No.	SEQUENCE No.
	PEAK	OFF-PEAK		M								BASE YR.	HORIZ. YR.	BASE YR.	HORIZ. YR.			BASE YEAR	HORIZON YEAR	No. OF ONE-WAY PEAK HOURS (MAX. 48)		
1 2 3	4 5	6 7	8	9	10 11 12 13 14	15 16 17 18 19	20 21 22 23 24 25	26 27 28 29 30 31	32 33 34 35 36 37	38 39 40 41 42 43	44 45 46 47 48 49	50 51	52 53	54 55	56 57	58 59 60 61	62 63	64 65 66 67	68 69 70 71	72 73	74 75 76 77	78 79 80
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3. Forecasting Methodology - Objectives

In order to prepare forecasts for the large number of projects included in the Priority Planning System Improvement List, it is necessary to:

- develop a work schedule and resource allocation for the project.

- review the forecasting inputs used in the previous year's system on a project by project basis, and categorize the projects in terms of: minor updating or adjustments, or complete reanalysis of data. Criteria for this categorizing would include: appropriateness of past land use and travel demand forecast, changes in project characteristics (e.g. length), changes in traffic volume counts, results of previous system run, project cost estimates, etc.

- use a methodology for the forecasts which emphasizes consistency, soundness of results on an area-wide basis, and speed of application. It should be remembered that the forecasts are being used as one input into a system which develops comparisons between projects across the Province at the roadway-link level of detail. The forecasts should not be directly transferable to a more detailed analysis (e.g. a Highway Design project) but may serve as a general guideline to such an analysis.

4. Project Types & Sequential Dependencies

4.1 Project Types

In general, the forecasting methodology breaks down into four categories based on type of project and priority:

- widening of existing highway - update
- widening of existing highway - reanalysis
- new facility - update
- new facility - reanalysis

In the first two cases, the forecasting is nether complicated nor time-consuming due to the generally small number of links involved in the project (it is usually assumed in such projects that the widening will not change the link volumes on the route, hence diversion from adjacent routes need not be considered).

In the third case, it is determined that the data used in the previous year's forecast is still valid; an updating by one year of the base data may be all that is necessary. Also included in this category are projects where it appears that construction is imminent; a complete reanalysis of the data for such a project would be an ineffective allocation of resources.

In the fourth case, a major allocation of time, human and computer resources is required. The remainder of this report will concentrate on the methodology used for this last case.

4.2 Sequential Dependencies

It should also be noted at this point that the sequential dependencies between projects often plays an important role in the forecasts. In its simplest application, it is initially assumed (usually through

consultation between the staffs of the Transportation Demand Forecasting Office and Highway Program Planning Offices) that a highway will be extended from point A to point B, and then, at a later date, to point C. It is necessary for the project, from B to C, to develop forecasts which take into account the existence of the A to B link for both the base and horizon years.

In a less obvious application, it must be determined whether the A to B project, for example, has the effect of diverting traffic to or from any other road section on the improvement list, a widening of a nearby existing highway, for example. If such effects do exist, then the sequential dependency between the extension and the widening project must also be determined and taken into account in the forecasts for the widening project.

5. Description of Forecasting Methodology

5.1 Computer Simulation

The Priority Planning System requires at least four sets of forecasts to be submitted for each project:

- base year without the improvement
- horizon year without the improvement
- base year with the improvement
- horizon year with the improvement

Forecasts for an intervening year(s) may also be necessary if some abrupt change in land use or network is anticipated.

For the case of complete reanalysis of data for a project involving a new facility, computerized network assignments are made for the four conditions to aid in the analysis. For the MTC's Central Ontario Planning Region, as an example, the inputs to the trip assignment program currently consist of:

1. Central Ontario Region (COR) off-peak road network, year 2001
2. COR year 1976, 24-hour true O/D auto trip table
3. COR year 2001, 24-hour true O/D auto trip table, for the COR-B land use assumptions.

The computer program (TR02525) builds minimum time path trees between all traffic zones in the network and assigns the trip table on that basis. Program TR02532 will produce plots for both the "before" and "after" networks with the assigned volumes, both base and horizon year, displayed for each link of the network.

5.2 Analysis of Computer Simulation

The steps required in the manual analysis of the computer simulation and the preparation of the demand estimates for

the case of complete reanalysis of a new facility, can be described as follows:

Step 1. Calculation of traffic diversions: By comparing the assignment for a given year on the different networks, the changes in link volumes (plusses or minusses resulting from the improvement) are calculated. Links with no change can be ignored.

Step 2. Determination of study area: It is usually found that the majority of the assigned volume on the links of the new facility is diverted from links within a small area adjacent to the new facility. There may, however, be small amounts of diversion (totalling no more than about 10% of the total) on links far removed from the improvement. Since these latter diversions are mainly between freeways, they can be ignored, and the limits of the study area for the improvement can be set to include only those links, close to the improvement, which comprise the vast majority of the diverted traffic. If the number of links in the study area is kept at a manageable level without affecting the quality of the analysis, significant savings in manpower and, hence, better resource utilization will result. It will also provide benefits in terms of route numbering (see Section 5.3.2, below).

Step 3. Estimation of traffic volumes - "before" condition: In general, the "before" condition for the base year consists of actual sectional AADT count data, available from the Provincial Highway, Regional Municipality or County, and Municipal Road Inventory Appraisal sheets, municipal road needs studies, etc. In some cases, minor adjustments may be necessary to bring the data to a common base year. Major adjustments, however, may be made in the case where sequential dependencies between projects exist (see Section 4.2, above). The "before" condition for the horizon year must be determined for each network link

based on data from several sources: results of the computer simulation (growth in terms of absolute numbers or ratios), plus trend analyses, plus any other appropriate sources of data (forecasts generated previously for other purposes - highway design projects, for example).

Step 4. Estimation of balanced traffic volume diversions: Step 1 of this analysis provided calculations of traffic diversions by link for two time periods based <u>directly</u> on the output of the computer simulation. Adjustments to the computer diversion should be undertaken in the following manner:

- the demand on the new facility for base and horizon year must be estimated. In many cases, forecasts have previously been done as part of highway design or other projects and such sources must be checked before using the computer assignment as a guide for estimating the demand on the new facility.

- analysis of screenlines across the study area is undertaken in order to get an exact balance between the "plus" diversion to the new links and the "minus" diversions from the links of other parallel routes. Rounding of values to the nearest 500 AADT is acceptable for high volume links. For links perpendicular to the new route, an exact balance will not necessarily occur, so that the diversions (either plus or minus) must be determined by an analysis of flows on the network. (Exhibit #2 gives a simple example).

- interpolation of the data may be required in order to simulate the precise years required. If the computer simulations are based on 1976 and 2001, for example, and the analysis requires a base year of 1980, then an interpolation of the two balanced calculations must be made.

Exhibit 2/ Sample of Balanced Diversion to New Route

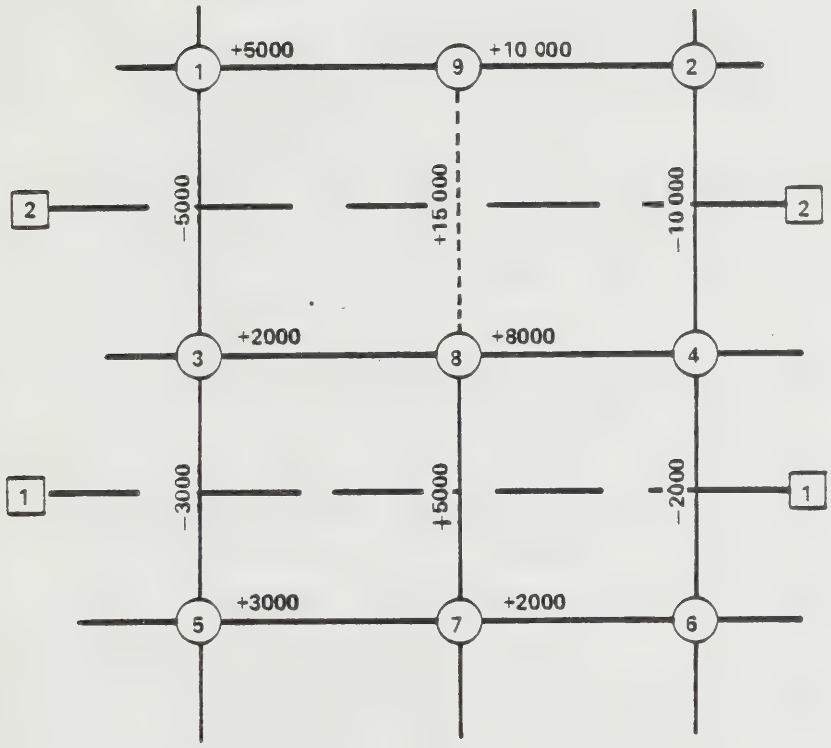
EXISTING LINK

IMPROVEMENT LINK

SCREENLINE 1 1

NODE No. 1

DIVERSION +5000



Notes:
- Exact Balance on Screenlines 1 and 2
- Exact Balance at Corner Nodes (Nos. 1, 2, 5, 6)
- Analysis of Flows Indicates that:
  - Shift of 2000 from Links 6-4 and 4-2 to Links 7-8 and 8-9 Must Also Appear as a Plus on Links 6-7 and 9-2
  - Shift of 8000 from 4-2 to 8-9 Must Also Appear as a Plus on 4-8 and 9-2
  - Similarly for Shifts from Links 1-3 and 3-5

Step 5. Final verification of analysis: A final review of the analysis is undertaken based on the three sets of data generated in the analysis: the "before" AADT conditions for both base and horizon year, the balanced diversions and the "after" conditions for both years, (calculated on the difference between the first and second data set).

The following "rules of thumb" govern this review:

- for the balanced diversions, screenlines perpendicular to the improvement must balance exactly to zero;
- on a link-by-link basis, the balanced diversion should generally be greater (in terms of absolute value) for the horizon year compared to the base year;
- for the "after" AADT condition, all links must, of course, have volumes greater than zero;
- for the "after" condition, links volumes, in general should be higher in the horizon year than the base year, i.e. [AADT (before) - balanced diversion] horizon year $\geq$ [AADT (before) - balanced diversion] base year;
- for the "after" condition, volumes along a route parallel to the improvement should not fluctuate drastically between links, e.g.

Links 1 - 2	=	20,000
Links 2 - 3	=	5,000
Links 3 - 4	=	20,000

5.3 Preparation of Input

The information related to travel demand to be coded on the "E-card" sheets includes:

1. System Element number, Improvement number, and System Type: For identification purposes, as provided by the Highway Program Development Branch.

2. Existing Route Alternative number and "M" number: For identification and analytical purposes, the road network must be divided into separate, continuous routes. A maximum of ten routes (excluding the improvement) is permitted by the program. It is because of this limitation that the study area for each project (Section 5.2.2 above) must be kept to a manageable size; even then the routing diagram may become very complex, as shown in the sample, Exhibit #3. (Exhibit #4 demonstrates the use of a dummy node to reduce the number of routes used in the analysis, if required to meet the programming limitation). The "M" number is coded as either 1 or 2 as shown in the instructions on the input form (Exhibit #1). The Existing Route Alternative number and M number are coded only at the beginning of each route, starting with Route = 1, M = 2 and continuing: Route = 2, M = 2; ... Route = 9, M = 2; Route = 1, M = 1; ... Route = 9, M = 1, and lastly the improvement links wherein Route is left blank, but M = 1. The tenth route, if required, is coded with an 'A'.

3. A - node, B - node: For defining the network links, may be coded in either direction.

4. AADT: Note that the base and horizon years must be indicated in the large boxes.

5. Truck Percentage: This data can be extracted from existing road inventory information. In the absence of any other precise data, it is usually assumed that single unit trucks constitute two-thirds of all trucks, and that base and horizon year percentages will remain equal.

6. P.C.S. number: For sections of the Provincial Highway system, the permanent counting station number is entered.

Exhibit 3/ Sample Numbering of Nodes and Routes

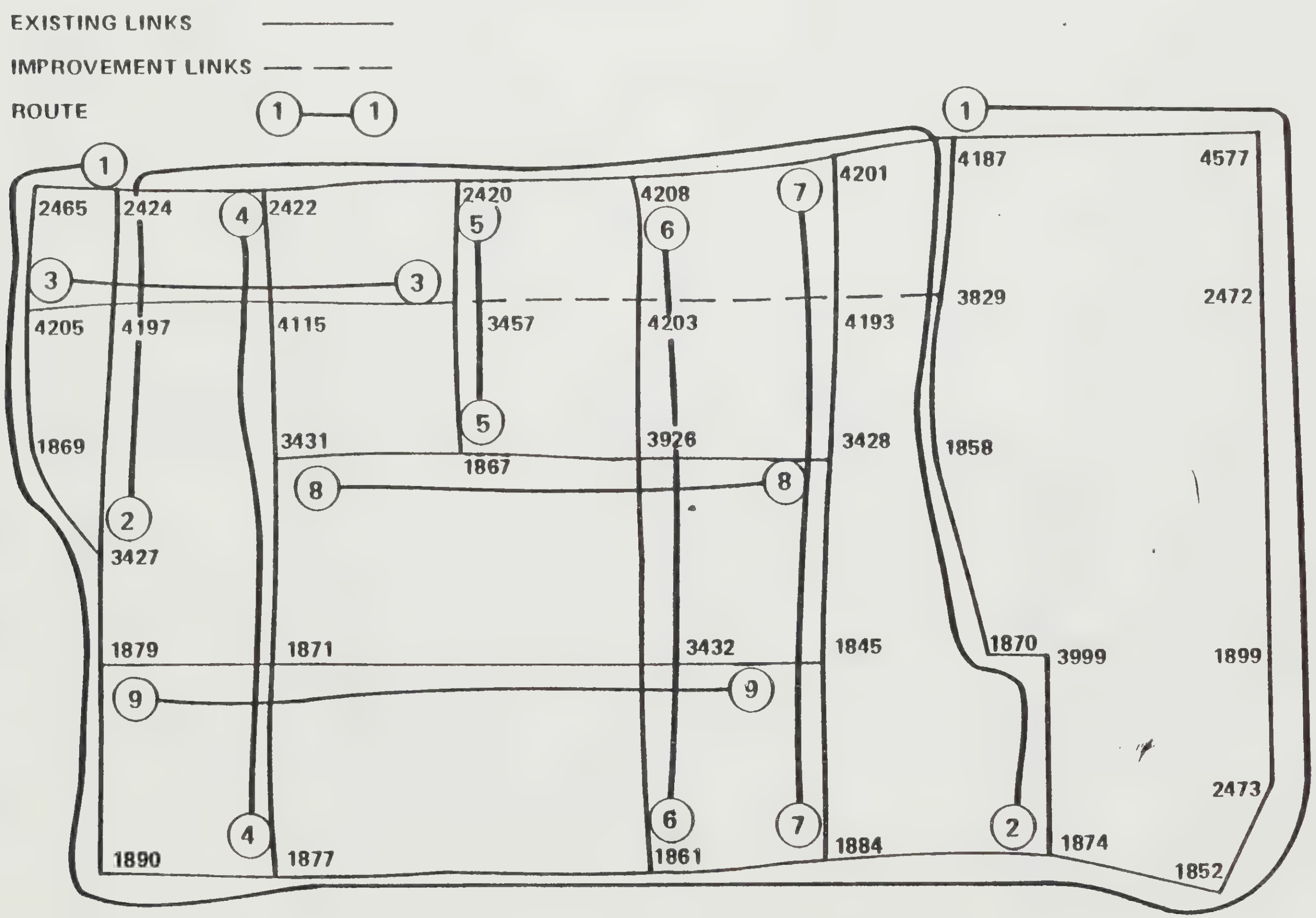
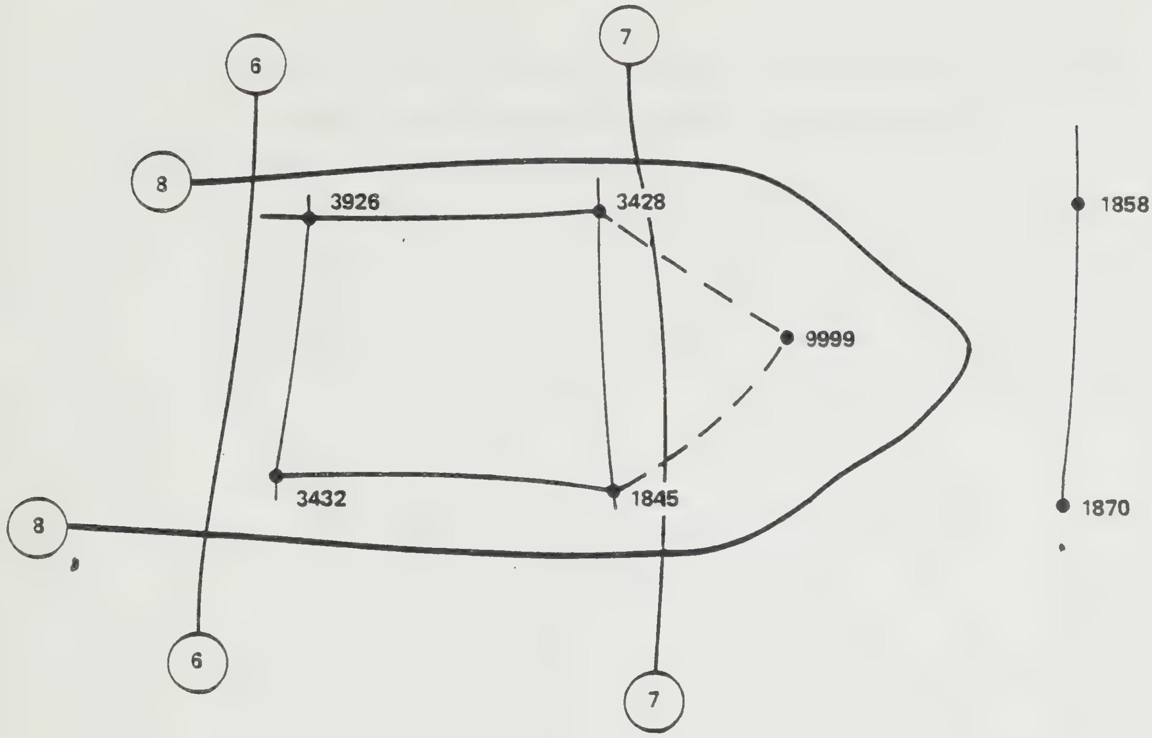


Exhibit 4/ Use of Dummy Node to Reduce Routes



Notes: – Dummy Node = 9999

– Dummy Links = 3428 – 9999, 9999 – 1845

– Should Be Coded with AADT = 0 for All Cases

7. Occupancy rate (persons per vehicle): This data may be found in the results of roadside origin/destination surveys, if there were any recently taken in the vicinity of the study area. The value may range from about 1.3 in commuter situations to about 1.7 in recreational/tourist areas.

Exhibit #5 illustrates a sample of a completed input form for the travel demand forecasting component of the Priority Planning System.

Exhibit 5/ System 037 – Road User Benefits (Completed)

INPUT FORM 3-USER BENEFITS (CODES 300-399) ROUTE DESCRIPTIONS

REF. TO "INSTRUCTION MANUAL - SYSTEM 037 USER BENEFITS"

1	2–5 SYSTEM ELEMENT No.	6 IMPROVEMENT No.	7 IMPR. ALT. No.	8–13 SYSTEM TYPE
E	6011	1		24D

Pg 1 of 6

M – ENTER ONLY IN FIRST LINE OF EACH GROUP (EXISTING WITH OR WITHOUT IMPROVEMENT AND IMPROVEMENT GROUP)

ENTER 2 FOR WITHOUT IMPROVEMENT
1 FOR WITH IMPROVEMENT
1 FOR IMPROVED GROUP

ACCIDENTS PER MILLION VEHICLE MILES	URBAN ONLY: No. OF HOURS PARKING ALLOWED – PEAK	URBAN ONLY: No. OF HOURS PARKING ALLOWED – OFF-PEAK	EXIST. ROUTE ALT. No.	M	A NODE	B NODE	A.A.D.T. FOR YEAR INDICATED: 1980	A.A.D.T.: 2001	A.A.D.T.	A.A.D.T.	A.A.D.T.	% SINGLE UNIT TRUCKS BASE YR.	% SINGLE UNIT TRUCKS HORIZ. YR.	% TRANSPORT TRUCK BASE YR.	% TRANSPORT TRUCK HORIZ. YR.	P.C.S. No. (RURAL)	OCCUPANCY RATE	URBAN LINK: ONE WAY PEAK HOUR VOLUME (VEH./HOUR) BASE YEAR	URBAN LINK: ONE WAY PEAK HOUR VOLUME HORIZON YEAR	No. OF ONE-WAY PEAK HOURS (MAX. 48)	SYSTEM ELEM. AND IMPR. No.	SEQUENCE No.
			1	2	4193	4115	7500	9000				10	10	5	5	74	1.5					
					4115	3829	15500	18000				10	10	5	5	74	1.5					
					3829	3457	19500	24000				10	10	5	5	74	1.5					
					3457	3428	21000	28000				8	8	4	4	74	1.5					
			2	2	1861	3924	19000	27500				6	6	3	3		1.5					
					3924	3926	19500	37000				7	7	3	3		1.5					
					3926	1858	15600	23000				7	7	3	3		1.5					
					1858	1867	11400	18000				8	8	4	4		1.5					
					1867	1869	12400	20000				8	8	4	4		1.5					
					1869	1871	13000	20000				9	9	5	5		1.5					
			3	2	4261	4197	14200	25000				4	4	2	2	22	1.5					

6 Priority Planning System Projects - 1981

6.1 Background

This section of the report provides an inventory of some of the major improvement projects which were contained in the P.P.S. list for the 1981 update. Exhibit #6 indicates that the MTC's Central Administrative Region contains the largest portion of projects, for both widening and new routes. In terms of estimated construction cost, Central Region represents about 70-75% of the projected total cost for new routes in the province.

Because of the predominance of Central Region in terms of number of projects and resource requirements, the 19 new route improvements for this region will be highlighted in this section of the report.

6.2 Sequential Dependencies - Central Ontario

Of the 19 projects referred to in Exhibit #6, eighteen were included in the original improvement list. In order to undertake the computer assignments, a total of 19 networks were created, starting with the full year 2001 network and deleting one improvement at a time until the existing network was reached. These networks were numbered in reverse chronological order from network 10 (full year 2001) to network 10-18 (existing).

The sequential dependencies among these projects, which are determined arbitrarily and used for analytical purposes only, were determined from discussions with Highway Program Development Branch and are shown in chronological order in Exhibit #7. The nineteenth project (PPS #241-1), the extension of the Oakville Link (Hwy. 403) northerly to Steeles Ave. (just north of Hwy. 401), was not added to the list until late November, 1981. A separate analysis of this project was

EXHIBIT #6

NUMBER OF IMPROVEMENTS IN P.P.S. (JANUARY, 1982)

Region	Widenings	New Routes	Total
Southwestern	36	6	42
Central	70	19	89
Eastern	12	1	13
Northern	16	10	26
Northwestern	2	4	6
Total:	136	40	176

EXHIBIT #7

P.P.S. UPDATE - 1981

Sequential Dependencies - Central Region

Network #	PPS # (1981)	Highway & Section	Type
10-18	230-1	404 : Bloomington - Aurora S.R.	24D
10-17	230-3	404 : Aurora S.R. - Davis Dr.	24D
10-16	226-1	403 : Woodstock - Brantford	24D
10-15	237-1	427 : Rexdale Blvd. - Hwy.7	24D
10-14	220-1	89 Ext.: Hwy. 400 - Hwy. 7 & 12	221
10-13	205-1	7N : Keele - Bayview	24D
10-12	231-3	406 : Pt. Robinson - E. Main	24D
10-11	227-5	403 : Freeman Int. - Oakville Link	24D
10-10	226-3	403 : Brantford - Ancaster	24D
10-9	231-1	406 : E. Main - Townline Rd.	24U
10-8	232-5	407 : Hwy. 427 - Bathurst	26D
10-7	232-3	407 : Hwy. 427 - Airport Road	26D
10-6	232-1	407 : Airport Road - Hwy. 10	24D
10-5	214-1	28N : Peterborough - Young's Pt.	221
10-4	204-1	6N : Caledonia - Jarvis	221
10-3	232-7	407 : Bathurst - Woodbine	26D
10-2	233-1	407 : Woodbine - Kennedy	26D
10-1	233-3	407 : Kennedy - 9th Line	24D
10	-	Full network	-

undertaken in December, 1981; it was arbitrarily assigned a sequential dependency between networks 10-6 and 10-5.

6.3 Determination of Work Schedule - Central Ontario

As stated in Section 3, it was necessary to prioritize the analysis of the projects to ensure that the largest possible number of the 176 projects on the improvement list was completed within the allocated time period of July to September 1981.

For the original 18 new route projects in Central Ontario, priorities were assigned according to Exhibit #8, based on the following general criteria:

1. Hwy. 407 projects were assigned first priority. The previous analysis of these projects, done in 1977, was considered obsolete due to land use changes, and because the project limits for several of the previous travel demand forecasts were incompatible with the new projects (e.g. PPS #232-5 was formerly part of two projects: Hwy. 427 to Hwy. 400, and Hwy. 400 to Yonge St.). Also, these projects are very significant to the Provincial Highway program in terms of construction value.

2. Hwy. 403, 404 and 406 projects were given medium priority mainly because of the time span since the previous complete analysis (pre-1977). Personnel changes at the time of the formation of the Transportation Demand Forecasting Office also meant that a large portion of the expertise on these particular highways had been lost, an attempt to quickly re-establish this expertise was an important consideration.

3. Hwy. 6N and 28N were in the same situation as the second group, but were assigned a lower priority due to lower construction value.

EXHIBIT #8

P.P.S. FORECASTING PRIORITIES - 1981

Hwy.	PPS #	Network (before)	Network (after)
407	233-3	10-1	10
407	233-1	10-2	10-1
407	232-7	10-3	10-2
407	232-1	10-6	10-5
407	232-3	10-7	10-6
407	232-5	10-8	10-7
403	226-3	10-10	10-9
403	227-5	10-11	10-10
403	226-1	10-16	10-15
406	231-1	10-9	10-8
406	231-3	10-12	10-11
404	230-3	10-17	10-16
404	230-1	10-18	10-17
6N	204-1	10-4	10-3
28N	214-1	10-5	10-4
427	237-1	10-15	10-14
7N	205-1	10-13	10-12
89 Ext.	220-1	10-14	10-13

4. Hwy. 427 and Hwy. 7N form a unique case in that they are very closely related to, and must preceed the construction of Hwy. 407 between Hwy. 427 and Bathurst St. (PPS #232-5). Hwy. 427 was last given a complete analysis in 1977, while Hwy. 7N is a relatively new project on the list, and a cursory analysis was made in 1980. Based on the previous year's results of the P.P.S. system, it was found that these two projects received a relatively high construction priority, based not on their respective benefit/cost analyses, but by virtue of their relationship to project #232-5 and its benefit/cost performance. Hence, the travel demand forecasts for these projects have compartively less impact on the final results. For these reasons, Hwy. 427 and 7N were assigned a low priority.

5. Hwy. 89 Extension was given a complete re-analysis in 1980.

6.4 <u>Results of Work Schedule - Central Ontario</u>

Of the eighteen new route projects discussed above, fourteen were completed in the scheduled time period. Project #227-5 was not revised, since the analysis of the computer-generated travel demands revealed very little difference from previous assignments. The final three projects (Hwy. 427, 7N, 89 Ext) were, due to low priority and time constraints, given a cursory examination and the existing base year AADT volumes were adjusted slightly. Project #241-1 (Oakville Link Extension) was completely analysed during December, 1981.

The seventy road widening projects in Central Ontario were all reviewed, the base year AADT data was updated from 1979 to 1980 and the horizon year AADT was modified as required. Particular attention was paid to the several roads widening projects which were sequentially dependent upon one or more of the new route projects.

6.5 Results of Work Schedule - Other Regions

Exhibit #9 lists the new route projects outside of Central Region. Generally speaking, the analyses of these projects are less resource-intensive than those of Central Region due to the less complex networks within each study area. It is less imperative, therefore, to set a strict work schedule for this group of improvement projects.

The most serious constraint in the recent past, on the provision of forecasting data in these areas has been the gradual obsolescence of the land use projections upon which these Regions' vehicle trip tables are built.* Because of this, complete re-analysis of data was carried out on a small number of projects, most of which, while outside of Central Region (administrative), are still within the larger Central Ontario Planning Region (see Exhibits #10 and #11 for boundary comparisons).

Those projects with complete re-analysis of data in 1981 were:

Hwy. 8 New	(PPS #109-1)
Hwy. 400 New	(PPS #123-1)
Hwy. 11/17 New	(PPS #500-1)
Hwy. 130 New	(PPS #505-1)

The projects with complete re-analysis in 1980 and minor adjustments in 1981 were:

Hwy. 8 New	(PPS #109-3,5)
Hwy. 24 New	(PPS #114-1)

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*Note: The Transportation Demand Forecasting Office is currently engaged in a project specifically designed to update these tables. Until the completion of this project, the forecasts for projects outside Central Ontario Planning Region should be treated with caution.

EXHIBIT #9

NEW ROUTE PROJECTS, EXCLUDING CENTRAL REGION

Region	PPS#	Hwy.	Description	Type**
Southwestern	101-1	3 New	Leamington to Ruthven	221
	109-1	8 New	Hwy. 401 to Freeport Hill	24D
	109-3	8 New	Freeport Hill to Hwy. 24	221
	109-5	8 New	Hwy. 24 to Old Hwy. 8 (Galt South)	221
	114-1	24 New	Hespeler Bypass to North of Hespeler	221
	123-1	400 New	Coldwater to Gravenhurst	24D
Eastern	302-1	16 New	Rideau River to Manotick	221
Northern	401-1	11 New	Callander Bypass	24D
	405-1	17 New	Sudbury S.E. Bypass	221
	406-5, 406-7	17 New	Nairn Centre to Hwy. 6*	24D
	407-5	69 New	Mactier to Parry Sound North	24D
	407-7			24D
	408-1			24D
	408-3			221
	413-1	144 New	Sudbury N.W. Bypass	221
	414-1	667 Ext.	Hwy. 144 to Sultan	221
Northwestern	500-1	11/17 New	Thunder Bay Harbour Access	221
	505-1	130 New	Rd. to Hwy. 11/17	221
	502-1	17 New	Blind River Bypass	221
	503-1	17 New	Bar River Rd. to Sault Ste. Marie	24D

N.B. * These projects will be revised to rehabilitative category - 820201

** Type: New two-lane = 221
New four-lane divided = 24D
New four-lane undivided = 24U

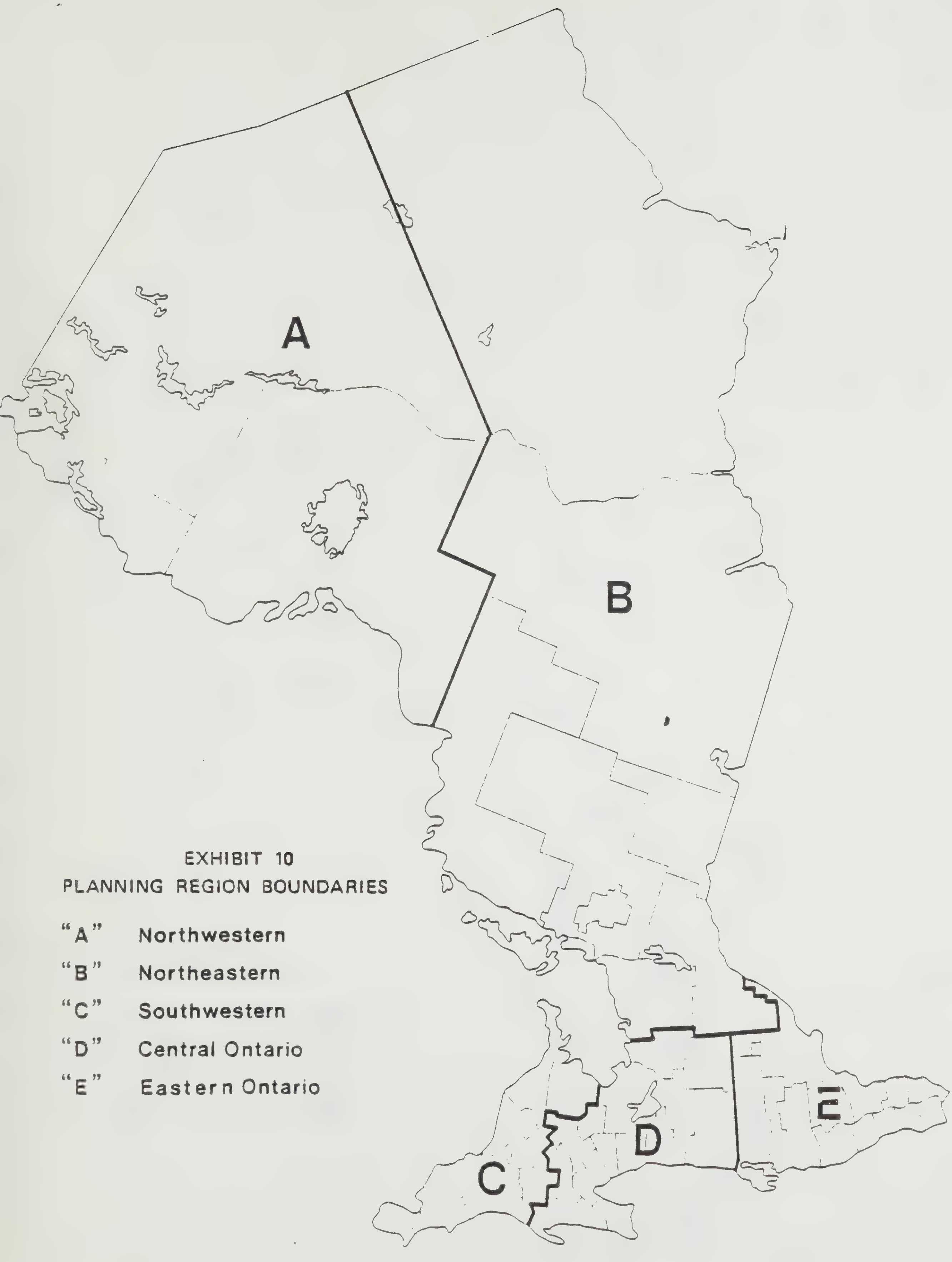

EXHIBIT 10
PLANNING REGION BOUNDARIES

"A" Northwestern

"B" Northeastern

"C" Southwestern

"D" Central Ontario

"E" Eastern Ontario

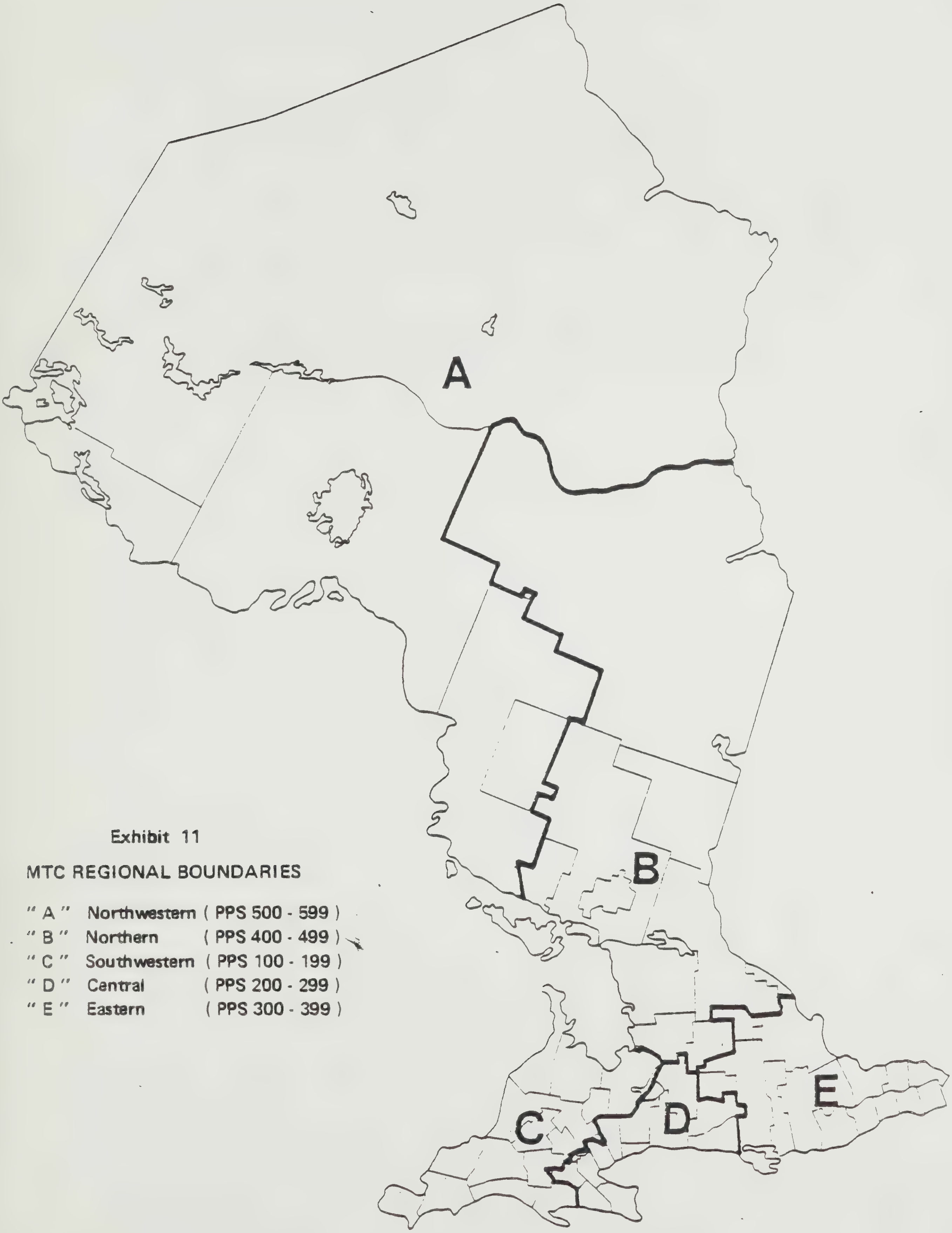

Exhibit 11

MTC REGIONAL BOUNDARIES

" A "	Northwestern	(PPS 500 - 599)
" B "	Northern	(PPS 400 - 499)
" C "	Southwestern	(PPS 100 - 199)
" D "	Central	(PPS 200 - 299)
" E "	Eastern	(PPS 300 - 399)

All remaining new route improvement projects (Hwy. 3 New (#101-1), Hwy. 16 New (#302-1), all in Northern Region and Hwy. 17 New (#502-1, 503-1)) are based on analysis which were undertaken substantially before 1980. No complete re-analyses have been, nor can be, undertaken on these projects due to the obsolescence of the trip tables.

The 66 road widening projects in these regions were all reviewed in a manner identical to those in Central Region.

7. Conclusions

Estimates of travel demands are a necessary input required by the Ministry's Priority Planning System, and such inputs (network components, AADT volume, truck percentage, PCS # and occupancy rate) will continue to be provided by the Transportation Demand Forecasting Office on a yearly cyclical basis. A methodology for undertaking the forecasts, in terms of both allocation of resources and actual forecasting technique, has evolved over the years since the introduction of the PPS, and continues to be highly satisfactory in light of the objectives of the PPS.

A major re-analysis of the travel demand forecasting inputs to the PPS was undertaken in 1980 and 1981, involving the new route improvement projects across the province. Complete re-analysis was carried out on 23 projects out of a total of 40, as follows:

Southwestern	Region	:	5 projects out of a total of 6.
Central	Region	:	16 projects out of a total of 19.
Eastern	Region	:	0 projects out of a total of 1.
Northern	Region	:	0 projects out of a total of 10.
Northwestern	Region	:	2 projects out of a total of 4.

On this basis, it is concluded that the remaining 17 (or fewer, depending on changes in project type and 1982 construction program) new route improvement projects should be given priority, in terms of a complete re-analysis of demand forecasts in the next two cycles of the Priority Planning System. These projects are listed on Exhibit #12. Analysis should also be undertaken, as required, on any new route improvement projects which are added to the Highway Program Development Branch's improvement list, either an entirely new project or a modification (e.g. change in construction limits) to a project currently on the list.

EXHIBIT #12

PRIORITY LIST FOR COMPLETE RE-ANALYSIS OF TRAVEL DEMAND
FORECAST INPUTS TO PRIORITY PLANNING SYSTEM

Region	PPS #	Hwy.	Description
Southwestern	101-1	3 New	Leamington to Ruthven
Central	205-1	7 New	Keele St. to Bayview Ave.
	227-5	403	Freeman Int. to Oakville Link
	237-1	427	Rexdale Blvd. to Hwy. 7
Eastern	302-1	16 New	Rideau River to Manotick
Northern	401-1	11 New	Callander Bypass
	405-1	17 New	Sudbury S.E. Bypass
	407-5,7 408-1,3	69 New	Mactier to Parry Sound North
	413-1	144 New	Sudbury N.W. Bypass
	414-1	667 Ext.	Hwy. 144 to Sultan
Northwestern	502-1	17 New	Blind River Bypass
	503-1	17 New	Bar River Rd. to Sault Ste.Marie

N.B. All projects outside of Central Ontario Planning Region cannot be completely re-analysed until updating of trip tables is complete.